

Parametric Sub Bottom Profiler Measurements of the Subaquatic Portion of the Debris Fan of Gschliefgraben in Lake Traunsee, Austria

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SUMMARY

During the last centuries, several landslides were recorded in the Gschliefgraben. In the course of these mass movements; even settlements were pushed into Lake Traunsee. The last major event took place in winter 2007. As the mudslide moved with a maximum displacement velocity of 4.7m/day, it endangered a road as well as about 45 houses which were located at the alluvial fan. A failure of the sub aquatic portion of the debris fan was considered a potential risk. A monitoring and an early-warning system had been developed and established in order to know the actual state of the movements and to characterize the behavior of the Gschliefgraben in the near future. In 2013 a bathymetry case study at Lake Traunsee had been initiated due to new kinds of hydrographic survey equipment capable of providing substantially higher data density, resolution and accuracy than the traditional sounding methods. In this paper the application of the parametric sub bottom profiler (SBP) for high-resolution sediment echo sounding of the Gschliefgraben will be described. The work had been carried out in the framework of Innomar's Student Project 2013, an initiative of the German manufacturer of electronics and software for the marine and offshore business. The first and the second author of this paper had been selected out of 20 participants to be supported by the company with a SES-2000 parametric sub-bottom profiler and side scan sonar system to perform the scientific survey. The main objectives of the SBP survey were to determine: • if it is possible to acquire highly accurate bathymetry and sediment data with this parametric sub-bottom profiler, in particular as the slope is fairly steep • if critical zones, which might reactivate the mass movement, can be discovered • if the data can be used for monitoring purposes. Beside the SBP-survey a second ship surveyed the area of the mass movement deposit with a multi-beam echo sounder. At the subaquatic portion of the debris fan it was possible to acquire highly accurate bathymetry and sediment layer information with Innomar's SES-2000 light plus measuring system. In the surveyed mass movement deposit, zones of different reflectivity could be identified up to 15m subsurface. Side scan images of the debris fan surface collected at 600 kHz near the shore line - up to 40 m depth – show a high level of detail and may deliver additional information for further morphological investigations.

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